

Trusting you will find room in **THE BUILDER** to insert this design, which I have drawn to small scales for the purpose, I remain, Sir, your very obedient servant,  
January 10th, 1844. AGATHOS.

[We think this design not creditable to our correspondent. We should have, however, preferred it if it had contained on its ground story fewer and better apartments. A principal staircase, practice shows, is best removed to an external wall, leaving quite free the space up to it, as by such a disposition, entanglement with all doorways is avoided. Thus would be obtained a much handsomer hall, which could be lighted by a well-hole in its ceiling, leaving around it, on the one pair story, a broad gallery. A butler's pantry near the dining-room is required; but a portion of the housekeeper's room (which is over large for the scale of the other apartments) might be cut off for that purpose; and at the same time a passage might be obtained to the adjoining bed-room, which could then be very properly assigned for use to a man-servant; or these three apartments could be arranged so as to be opposite the three windows.

We should have avoided all irregularity in

the rooms caused by cutting off their corners; deem one of the requisites of a perfect plan to lie in making every apartment regular, even though the general form of the whole building be not so. The elevations we should re-arrange, avoiding the crowding of the entablature over the principal entrance, and the forming of central piers in the different component masses of the design, which we hold to be against one of the elementary principles of taste, a chapter upon which head we propose giving hereafter. We should have avoided the introduction of a large Venetian window to an apartment so small as the dressing-room over the entrance-hall, and also as not being an article of very good taste, though now so often used. Moreover, we should have omitted the two blanked ashed-windows which flank it, perfect architectural design not allowing any parts for mere show, but requiring the whole work to come together elegantly with every requisite, and without any such sacrifice. The chimney-shafts we should, both for effect and just operation, have liked better if they had not been paneled, but formed in some way with detached flues. We should be happy to receive another design from our obliging correspondent.—Ed.]

#### VAULTING OF KING'S COLLEGE CHAPEL, CAMBRIDGE.

TO THE EDITOR OF "THE BUILDER."  
Sir,—In the article on King's College Chapel, which appeared in **THE BUILDER** for Dec. 9, it is asserted that the great key-stones of the roof "may actually be removed without endangering the safety of the vaulting."

It is scarcely feasible that the building would have been encumbered with those immense additional weights, had there not been an absolute necessity for their insertion; that such a necessity existed, will, I trust, be sufficiently proved by the following explanation of the principles on which the roof is constructed:—

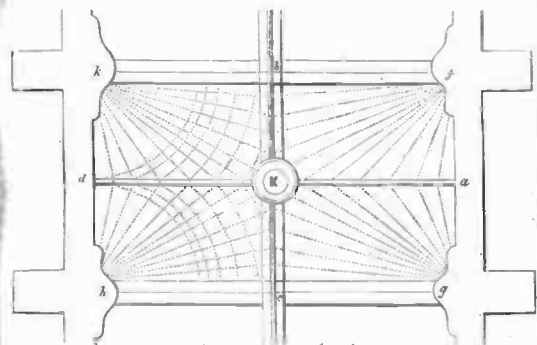


Fig. 1.

Fig. 1 represents a projection upon a horizontal plane of one compartment of the roof included between the four buttresses  $fghk$ ; and Fig. 2 represents the projection of half this compartment upon the vertical plane of one of the windows on the south side; the same letters in the two figures refer to the same points.

The rib  $bce$  runs from the east to the west end of the chapel, the stones which form it lie in the same horizontal line, and at a greater elevation from the ground, than any other part of the roof;  $K$  is the central stone of the compartment, and is the upper part of one of the ornamented drops seen from below hanging from the roof of the interior. The stones in  $nkd$  lie in an arch of which  $K$  is the key-stone; it is clear that the tendency of this arch is to sink at the crown,  $K$ , and thrust down the walls  $a$  and  $d$ . I shall proceed, then, to explain how the stones in this arch are supported; and also the stones in the rib  $bce$ ; and in the course of the explanation it will be seen that I show how every stone in the compartment is supported.

On examining the roof carefully, it will be seen that the stones are placed in semi-arches in vertical planes through the buttresses; the spring of all the semi-arches in the space  $bce$  is at  $f$ , and their crowns or key-stones lie

in the courses  $b$  or  $K$  or  $Ka$ ; this is best seen in Fig. 2. Now, any stone  $S$  in the arch  $nkd$  is

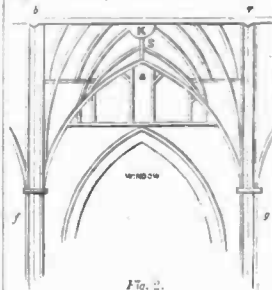


Fig. 2.

the key-stone of the two semi-arches  $Sf$  and  $Sg$ ; and the thrust of the stones in  $Kb$  is propagated down the semi-arches  $Sf$  and  $Sg$ , and ultimately acts upon the buttresses at  $f$  and  $g$ ; the same is true of every stone in  $Ka$ ; likewise on the other side of  $bce$  the stones in  $Kd$  are supported by the semi-arches of which they are the key-stones, and which spring from the buttresses  $h$  and  $k$ . Again, any stone  $P$  in  $Kb$

is the key-stone of two semi-arches  $Pk$  and  $Pf$ , and is held in its place by the thrust in the stones in  $K$ ; and this thrust is propagated down the semi-arches,  $Pk$  and  $Pf$ , and acts ultimately upon the buttresses  $k$  and  $f$ ; the masonry of the rib  $bce$  is sufficiently heavy to prevent these semi-arches from sinking by their key-stone rising. It will be clearly seen, then, how every stone in  $bce$  and  $nkd$  is supported; it will also be seen that every other stone in the roof is sustained by being a member of a semi-arch springing from one of the buttresses, and having its key-stone in  $bce$  or  $nkd$ . The pressure of the compartments  $fghk$  upon the buttresses acts obliquely: for instance, that on  $f$  will act downwards. In a line whose projection on the horizontal plane will lie towards the south-east. But the compartment east of  $fghk$  will press upon the buttress  $f$  in a line whose horizontal projection lies towards the south-west; and consequently the resultant of these pressures will act in a line whose horizontal projection runs due south. Let  $FV$  be this line (Fig. 3); this figure represents one of the buttresses. The dimensions of the buttresses are so arranged that  $FV$  shall lie within the masonry and pass into the foundation within the foot of the buttress.

Fig. 3.

The resultant pressure of the roof on the walls at each of the four angles of the whole building acts obliquely, consequently instead of buttresses of the ordinary form at these four angles, towers crowned with lofty turrets are erected, of such a weight as to deflect the line of pressure of the roof, and cause it to pass into the ground through the masonry.

Mr. Hland, in his work on piers, arches, &c., speaking of this building says, "the key-stone, which is of great weight, is placed in the centre of every four buttresses, and is most essential, not only as a wedge, but from its great weight, locking up, so it were, the lighter part of the roof in perfect safety against being displaced by the fortuitous pressure of any person's foot."

I am, Sir, your obedient servant,

C. J. HUTT.

Cambridge, January 16, 1844.

#### PUBLIC BATHS AT NEWARK.

We are glad to announce that the little town of Newark is about to have erected in it public baths for the accommodation of all who may be desirous of availing themselves of the healthiness of bathing. The site chosen for the baths is within the walls of the ancient and venerable castle. To those who are unacquainted with Newark, it may not perhaps be uninteresting to add, that the Castle stood three sieges, and was the last of the king's fortresses in the north to surrender, and surrendered then only by the express command of his Majesty Charles the First, in 1646. It is recorded that one Lord Malbair, the heroic governor of Newark Castle, communicating the king's orders for surrendering the Castle and town of Newark, Major Smith (a brave officer) urged the governor with tears to trust to God and SALLY (the name of a famous piece of ordnance in the Castle), rather than think of yielding the town to the Parliamentary forces; and also that the citizens, with the mayor at their head, beseeched the governor on their knees to disobey the king's orders for surrendering the Castle. The Crown having agreed to grant a lease of the Castle and Bowling Green, for the purpose before mentioned, in consideration of the lessees laying out a certain sum, the expense is proposed to be defrayed by subscriptions in shares of 50 each, to be transferable. We hope shortly to witness the commencement of the baths and their erection, considering, as we do, that such will be an improvement as well as an advantage to the town, which, in point of situation, with land and water carriage to all parts of the kingdom, excellent roads and well-supplied markets, yields to none in the realm.—(From a Correspondent to the Nottingham Journal.)

Pratt's Mathematical Principles of Mechanics. Philosophy.